

**HW 4** Due on March 6th at 10:30 am. Name: \_\_\_\_\_

Write out your answers below. Feel free to use MATLAB to help you answer any of the questions.

## 1 Syntax

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Each of following programs has at least one error that will prevent it from running without an error message when entered into MATLAB. (See Iteration#Questions for similar problems with solutions.)

1. What are the errors and why will they prevent the program from running properly? (Don't just write down the error message that MATLAB gives - state the problem in terms used in the Iteration module.)
2. Suggest modifications to each program that will allow it to run without error.

```
clear;
A = [1,2,3,4,5,6,7,8,9,10];
for i = [1:10]
    A(i) = A(i-1)+1;
end
```

```
clear;
A = [1,2,3,4,5,6,7,8,9,10];
for i = [1:2:12]
    A(i) = A(i)-5;
end
```

```
clear;
A = [1,2,3,4,5,6,7,8,9,12];
for j = [1:12]
    A(i) = i+1;
end
```

```
clear;
A = [1,2,3,4,5,6,7,8,9,12];
for i = [1:1:10]
    A(i) = i+1;
End
```

```
clear;
A = [1,2,3,4,5,6,7,8,9,10,11,12];
for j = [1:2:12]
    A(j) = j+1;
end
```

```
clear;
A = [1,2,3,4,5,6,7,8,9,12];
for i+j = [1:1:10]
    A(i) = i+1;
End
```

## 2 For loop basic pattern

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```
clear;
B = 111;
for j = [1:4]
    B = B+1;
end
B = B + 12;
```

Write the long-hand version of the program to the left.

## 3 For loop general pattern

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```
clear;
i = 1;
a = 13;
i = 2;
a = i*i;
i = 3;
a = i*i;
i = 4;
a = i*i;
```

Write a short-hand version of the program to the left using a for loop.

#### 4 For loop basic pattern

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Write out the long-hand version of each of the two programs. Use the long-hand version to explain why they give different values for B.

```
clear;
B = 111;
for q = [1:3]
    B = B+1;
end
B = B + 12
```

```
clear;
B = 111;
for q = [1:3]
    B = B+q;
end
B = B + 12
```

#### 5 Creating an array with iteration

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The program given below can be used to compute the value (balance) of a savings account that earns three percent interest per year and started with an initial deposit of \$100 at the start of year 1. First write a short-hand version of this program. Use this version to answer the following questions:

1. If the balance at the start of year 1 is \$100, what is the balance at the start of year 2?
2. What is the savings account balance at the start of year 50?
3. Suppose that you wanted to have exactly \$716.2848 at the start of year 50. What interest rate is needed? (Hint: guess different values of the interest rate *a*.)
4. Extra credit: Write a program that uses an additional `for` loop to figure out the answer to the above so that you do not need to manually enter different values of *a* and re-run your program.

Original program:

Write a short-hand version of the program to the left using a for loop.

```
clear;
a = 0.03;
B(1) = 100;
i = 1;
B(i+1) = B(i) + a*B(i)
i = 2;
B(i+1) = B(i) + a*B(i)
i = 3;
B(i+1) = B(i) + a*B(i)
```